in inquiries into the efficacy of therapeutic agents as applied in actual practice. The last-named would perhaps have been better published separately, and need not be further considered here.

As regards "optochin," it is found that this drug exerts a specific bactericidal action on the pneumococcus in high dilutions in serum as well as in watery solution. It has been successfully used as an application in local pneumococcic affections, and though some have been favourably impressed with it in the treatment of pneumonia, others have not found it to be of value. There is also some risk to eyesight in its use.

The pneumonia of the Rand was found to be a pneumococcal infection, and the native seems naturally to possess much less immunity towards the pneumococcus than does the white man. Various trials were made of pneumococcus vaccine as a preventive of pneumonia, and it is finally recommended that a dose of 1,000 millions of pneumococci cultivated in glucose blood broth might be appropriately employed as an ordinary prophylactic dose, as this was found considerably to reduce the incidence of pneumonia among those treated, as well as reducing the mortality if pneumonia occurred among them.

A very large amount of experimental work was carried out in this inquiry by Sir Almroth Wright and his collaborators, and the manner in which the results were controlled and are tabulated are models of what a scientific investigation should be, and form a valuable contribution towards the control of a disease which causes serious loss of life, as well as being one of considerable economic importance in the Rand.

R. T. HEWLETT.

ELECTRICAL ENGINEERING.

(1) *American Handbook for Electrical Engineers: a Reference Book for Practicing Engineers and Students of Engineering.* Compiled by a staff of specialists. Harold Pender, editor-in-chief. Pp. xviii+2023. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 21*s.* net.

(2) *Electrical Engineering in India: a Practical Treatise for Civil, Mechanical, and Electrical Engineers.* By J. W. Meares. Pp. xxxvi+517. (Calcutta: Thacker, Spink and Co.; London: W. Thacker and Co., 1914.) Price 15*s.*

(1) IN its thousand pages this "American Handbook" contains information on an enormous variety of subjects arranged alphabetically from "Abbreviations" to "X-Rays." The work is a sort of combination of a library of text-books with a collection of formulæ and data. In the latter department, which must be regarded as its true field, the book will be found of great service to electrical engineers, but the utility of the text-book portion is, perhaps, open to doubt.

Each section appears to have been written by a man having a thorough and practical knowledge of the subject, and the theoretical and descriptive matter is excellent so far as it goes; where it bears directly on the tabulated matter it is also most useful. But the necessary limitations of space prevent it from being anything like a satisfactory substitute for the detailed text-book. We get just a very brief summary of the leading facts, but we are also given references to other books in which fuller information can be obtained.

Although we would not agree with everything contained in the book (for instance, we do not approve of "abohms," "abamperes," and so on, and do not even admit any necessity for the so-called "absolute" systems of units), we must say that the volume is a useful accessory to the electrical engineer's desk or library.

(2) This book contains a considerable amount of information on electrical matters with special reference to the conditions as to climate, cost, and legislation as they exist in India, but we have some difficulty in imagining a class of engineers to whom it will be really useful. The elementary matter is too scrappy, and too much jumbled up to be of service to a beginner, or even to one who has forgotten; to the man who knows already it would be sheer waste of time to read it.

There is much descriptive matter, but there are very few illustrations; without them the written matter is almost worthless. Most engineers will, we think, prefer a good standard text-book, of which there are a few, for getting up the elementary theory, and one of the well-known "pocket-books" for tabulated data.

DAVID ROBERTSON.

OUR BOOKSHELF.

English Folk-song and Dance. By F. Kidson and M. Neal. Pp. vii+178. (Cambridge: At the University Press, 1915.) Price 3*s.* net.

IT is only in recent years that with the active collection and study of European folk-lore the folk-song and folk-dance have begun to receive the attention which they deserve. The collecting of English folk-songs, begun by the Rev. J. Broadwood in 1843, has since that time been actively prosecuted by Miss L. Broadwood, W. Chappell, Dr. Barrett, and Mr. Baring Gould. In 1898 the Folk-song Society commenced its labours, and has year by year added to our knowledge of British and Irish folk-music. A summary of the progress already made and instructions to the collector were badly wanted. This has now been supplied in the present book, which deals satisfactorily with the problem of the origin of folk-music, and fully describes the methods of nota-

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tion. The songs of the folk are classified under the heads of narrative ballads, love and mystic songs, pastorals, the songs of the poacher and the highwayman, the soldier and the sailor, the pressgang, hunting, sporting and labour songs, carols, singing games of children, the popular street ballad, and the broadside.

As for the folk-dance, much of the knowledge which we possess is due to the enthusiasm of Mr. Cecil Sharp, who has hunted down the veteran dancers, and taught them how to instruct the minor societies which have been started in almost every large centre. The authors deny that the Morris dance is connected with the Moors, and prefer without good reason a Celtic derivation which makes it to mean "noble." The suggestion that it may be in part due to the Salii or leaping priests of Rome is hazardous; there is more to be said for the theory which connects some of the figures with a primitive sun-worship. The sword-dance seems to be derived from some primitive rites of fertility. The manual is a good introduction to the subject, and the bibliography and illustrations leave little to be desired.

Masonry as Applied to Civil Engineering. By F. N. Taylor. Pp. xi+230. (London: Constable and Co., Ltd., 1915.) Price 6*s*. net.

THE early part of this book contains descriptions of the various kinds of stones used in civil engineering, together with the methods of working and handling them. This portion cannot be described as altogether complete in itself; there are many references to another book by the same author. There is a certain off-hand manner in the treatment which has led to one, at least, unfortunate result. On p. 23 calculations appear giving the load which can be raised by a set of Weston's blocks when a given pulling force is applied. No allowance has been made for friction, hence the result of the calculation is altogether misleading.

In the later portions of the book the author deals with retaining walls, dock walls, dams, bridges, towers, monolithic and block concrete construction, shoring, and underpinning. It is probable that the reader will derive more benefit from the descriptions and drawings given in these portions than from the very brief theoretical discussions and calculations. On p. 43 there is an illustration showing a surcharged wall, together with a few lines of description supposed to indicate how to obtain the thickness of the wall. There appears to be some omission in the illustration; it is impossible to grasp the author's meaning. The treatment of the wedge method on p. 45 is imperfect, and again there appears to be omissions in the illustration.

In general, the author gives formulæ without any explanation of how these are derived. We do not think, therefore, that the book is likely to meet the requirements of modern students, who, for the most part, desire to be perfectly clear regarding the derivation, limitations, and assumptions involved in any formula which they are called upon to use in design.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Nature of Gas Ions.

OUR knowledge of the nature of gas ions is derived mainly from measurements of their mobility in an electric field. Experimental evidence has shown that as the pressure (p) is altered the mobility (k) of the ion alters generally in accordance with the law, pk=constant; when this law holds good it is safe to conclude that the ion remains unaltered at the different pressures. One of the most interesting results of experiment is that in the case of the negative ion formed in air the product pk increases as the pressure is diminished below about 10 cm.; this result indicates a simplification in the nature of the negative ion at the lower pressures. Prof. Townsend and his students have examined this phenomenon in great detail, and have come to the conclusion that the velocity (v) of the ion should be expressed as a function of the field (X) and the pressure (p) in the form $v=f(X/p)$, indicating that the nature of the ion depends on the field and the pressure. In his recently published treatise Prof. Townsend concludes that the negative ion in a dry gas is in general a cluster of molecules which for a certain range of electric forces and pressures passes through a transition stage until finally, when X/p exceeds a certain value, the negative carriers are practically all electrons.

In some experiments recently undertaken to determine the mobilities of the ions formed by the radiation from polonium in thoroughly dried air, I have been led to conclusions essentially different from those now generally held. From a pressure of one atmosphere down to about 8 cm. the results were normal; at pressures below 8 cm. the negative carriers were found to consist of two kinds, electrons and ions, the former increasing in number relatively to the latter with diminishing pressure. In no instance was there any evidence of an intermediate or transition stage, the separation between the faster and the more slowly moving carriers remaining throughout clear and distinct. I was able to measure the velocity of the negative *ion* at all stages until resolution between the two kinds of carriers was no longer practicable, and it was ascertained that the value of pk remained constant from one atmosphere down to the lowest pressure employed (1/7 mm.), indicating that the negative ion remains unaltered in nature over this wide range of pressures.

The fact that electrons exist in dry air at the lower pressures is, of course, well known, but at a pressure of 12 mm. the ions constitute at least 80 per cent. of the negative carriers and at 1/7 mm. more than 50 per cent. The proportion of ions and electrons depends solely upon the pressure, the effect of the field being for the most part small or negligible. For the negative ion at all pressures v was found to be directly proportional to X/p; there seems to be no necessity for introducing any unknown function of X/p.

The fact that the electrons travel through several centimetres of a gas at pressures as high as 8 cm. without attaching themselves to neutral molecules is remarkable, and seems to imply that the distribution of carriers between ions and electrons must be determined immediately after the act of ionisation; it would appear that the electron has to be fired into the mole-

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